terminated fatally. To cap the whole, the rates of remuneration are not such as to make the post a very enviable one in a pecuniary point of view.

Honest Mr. Ronalds, of Hammersmith, who made some improvements on the telegraph in 1816, winds up a piece of sound advice to telegraph owners and operators, as to their treatment of "mischievously disposed persons" who might cut the wires, with the following words:—"Should they (the mischievously disposed persons) succeed in breaking the communication, hang them if you catch them, damn them if you cannot, and mend the wire immediately in both cases." It would have been well if the first, at least, of Mr. Ronalds' suggestions had been acted on in this country some time ago. It was constantly the practice for news-agents, after having telegraphed the news of the English steamer from Halifax or Boston to the journal by which they were employed, to endeavour to secure a monopoly for it by cutting the wires; and, strange to say, none of them were ever brought to punishment for their villany. Crimes of this description are much rarer at present. A close watch is kept on the movements of suspicious individuals by those through whose property the telegraph passes, and who feel that every man in the country is interested in its preservation. Some time ago, a man who was detected in cutting the wires in South Carolina, narrowly escaped being "lynched" by a party of infuriated citizens who caught him in the act; and there can be very little doubt that a jury would show no mercy to a similar offender who might be brought before them.

One of the most novel feats performed by the telegraph in America is transmitting intelligence in advance of time. Some years ago, as the clerk of the House of Representatives began to read the President's message, the telegraph operator began to transmit it to St. Louis. He kept pace with the clerk, and was seldom more than a few lines behind him. At St. Louis, printers were in attendance at the telegraph office, and set it up almost as fast as it arrived. Five minutes after the peroration was delivered at Washington, the last page of the message was in the steam-press at St. Louis: and a few minutes afterwards (viz., *at half-past twelve*, P.M.) boys were hawking in the streets the document which the clerk was still reading at Washington at *half-past one*. According to the clock, the inhabitants of St. Louis, who were 1,500 miles distant from the spot where the speech was delivered, heard it, and read it, an hour or more before those who were sitting in the hall where it was read. This difference of time between the eastern and western cities sometimes give rise to funny mistakes, which our readers will readily conceive.

In the present age, he is a bold man who can say to science, "Thus far shalt thou go, and no farther." We can only look with amazement at the projects which are mooted every day, of submarine telegraphs across the Atlantic; or lines of wire, like Puck's girdle, encircling the earth in forty minutes. Easy, indeed, is it to suggest obstacles to either—to allude to the impossibility, under our present arrangements, of charging a wire with such a quantity of electricity, that the best conductors known will not absorb it in a distance of upwards of 300 miles—to the constant accidents which are happening in our present lines, and which it would be almost impossible to detect and counteract in a submarine or subterranean line of a thousand miles in length—to the sheer absurdity of "telegraph stations" on the ocean, or amid the wilds of North America, or the ice-bound forests of Kamskatka—any schoolboy can raise these difficulties, and put them in a formidable shape. Whether the man of science is destined to overcome them is a question to which, however dangerous it might be to answer boldly in the affirmative, it would be both dogmatical and unreasonable to offer a decided negative. The earth, air, water, every known substance is, as we have seen, a conductor. A line carried round from New York to our Antipodes would constitute a perfect telegraphic circuit, according to modern writers. The fluid transmitted into the earth at either end, would instantly traverse the centre of the globe to rejoin the end of the wire buried at the other extremity. Who knows, but that, a few years hence, the electric fluid will be traversing in every direction, with its own peculiar instinctive sagacity, the bowels of the earth; and, besides drawing the colonists of Western America into close proximity with the nomade tribes of Africa or Asia, will disclose to an astonished world those mysteries which the science of the geologist and cosmogonist have not dared to penetrate?

CURIOSITIES OF THE CHEMISTRY OF ART.

"Chemistry!" exclaims, perhaps, the reader, "What have I to do with chemistry, or it with me? It is a dry compound of signs and properties, of elements and equivalents, of oxides, chlorides, iodides, and salts—a fit enough theme for druggists' apprentices behind the counter, and for embryo doctors in college laboratories, but quite unworthy, either in intrinsic interest or in the results produced, of the study of unprofessional people."

Now, whether this be true or not, as regards the subject in its broader laws, and its minuter details, we shall not pretend to say, and without waiting to determine whether or not the repulsive forms of the science might not be modified into something more of attractiveness, we have simply to remark that there are many facts which the chemist has brought to light, and many curious processes—with the results of which we all have habitually to do—which are deserving the attention even of those who may be least interested in the technical exposition of chemical laws. And when it is remembered, that every form of matter with which we may have to do, whether it be in the world around us, or in our own bodily organisation—whether it be the simplest food we eat, or the clothes we wear—has been passing through delicate and beautiful processes of nature or of art, surely entire ignorance of all of them will not be defended. To a few of these we would now, very briefly, invite the attention of the reader.

The operations of chemistry have brought into employment a thousand substances which had otherwise been useless or pernicious. Like a prudent housewife, she economises every scrap. The horseshoe nails dropped in the streets during the daily traffic, and the bits of old iron which have been rusted in the timber of buildings, are moulded into the form of musket-barrels. The ingredient of which the ink which tracks its muddy route over this paper, was once possibly part of the broken hoop of an old beer-barrel. The bones of dead animals yield the chief constituent of the explosive element employed in the formation of matches. The clippings of the travelling-tinker are mixed with the parings of horses' hoofs from the smithy, or the cast-off woollen garments of the poorest inhabitants of a sister isle, and soon afterwards, in the form of dyes of the brightest hue, grace the dress of courtly dames. The dregs of port-wine, rejected by the drinker in decanting it, are taken by him in the morning, in the form of seidlitz powders, to aid in the removal of the effects of his libation. The offal of the streets, and the washings of coal-gas re-appear in the lady's smelling-bottle, or are employed by her to flavour blanc-manges for her friends.* Such is the economy of the chemistry of art, which, by the combination of apparently useless elements, produces, as though with the touch of an enchanter's wand, order out of confusion, advantage and beauty from the offensive and the injurious. And in these processes there is but an imitation of those of nature. Animals and vegetables live and die, and from their mouldering forms are given off into the atmosphere the materials from whence other races derive their means of subsistence, and thus the death and destruction of one generation furnishes the food and support of the next. Let us trace two or three of these operations more in detail, as illustrations of some of the myriad curiosities of the chemistry of art.

The processes which are gone through in the preparation of common carbonate of soda, or British alkali, will furnish

* Professor Playfair.

many illustrations of the advantages which have been conferred by chemistry on art, though to these we have space to make only brief reference. The period is very recent since one of the commonest sights on the Scottish coast was the collection and preparation of the sea-weed called kelp, which was used as carbonate of soda. The weeds were cut by the sickle at low water, and a rope of hemp or birch being laid beyond them, and the ends being carried up beyond the high-water mark, the whole floated as the tide ran, and by shortening the ropes, they were made to settle above the wash of the sea, whence they were conveyed to dry land on horseback. The more quickly the kelp was dried the better was the produce, and when dry it was burned in coffers. As twenty-four tons of weed were usually required to form one ton of kelp, it is easy to conceive that the labour employed in the several processes of cutting, landing, carrying, drying, stacking, and burning, was immense. The scene was, in many respects, a peculiar and an interesting one; and the trade largely increased the value of property on the coast.

The substance obtained from the kelp, was a hard, petrified mass, consisting of impure carbonate of soda; the entire quantity produced in Scotland and the adjacent islands being more than 25,000 tons annually. But a change came o'er the spirit of the dream of the kelp burners. The removal of the salt-tax introduced a method by which the required material might be obtained in larger quantities and at a cheaper rate than was ever before known; and the immediate result was, the reduction in the price of soda from some thirty or forty pounds to about as many shillings a ton.

Now it appears, that in the very simple process by which salt is converted into carbonate of soda, a large amount of muriatic acid gas is given off, which is very annoying to man, and destructive to vegetable life, and to get rid of it, opened up another opportunity for the exercise of the ingenuity of the chemist. Various devices were adopted for quietly getting rid of this troublesome substance, and Messrs. Tennant, of Glasgow, erected a gigantic chimney, 100 feet higher than St. Paul's Cathedral, for the purpose of dissipating the gas. But as the best way of destroying an enemy is to make him a friend, so the best way of getting rid of a noxious gas is to find a method by which it may be retained in a useful form. This has accordingly been done in the case before us, and those old chimneys remain as so many huge monuments of the ignorance of the past.

But this is not all. The improved method of producing soda from common salt led to another of equal importance, by which bleaching is carried on by chemical processes on the largest scale. The bleaching power of chlorine was only employed on a large scale after it was obtained from residuary muriatic acid, which, in combination with lime, may be transported to considerable distances. Had it not been for this, the cotton manufacture of Great Britain would probably have never successfully competed in price with the continent of Europe. In the old process of bleaching, remarks Liebig, every piece had to be exposed to the air and light during several weeks in summer, and kept continually moist by manual labour, for which meadow land, suitably situated, was essential. But a single establishment near Glasgow bleaches 1,400 pieces of cotton daily throughout the year. How enormous a saving has thus been effected in the capital which would have been required for the purchase of land had these methods been unknown!

A better illustration than this could scarcely be afforded of the aid which chemistry has brought to art, while the establishments in which these processes are carried on are full of interest. These are called "crofts"—says the writer of an article on the subject in the "Eclectic." "*These* 'crofts' are buildings where the incessant roll of engine and mill-work fills and floods the ear, and crushes the faculty of oral perception;—where hastening men drag to and fro heaps of dripping canvas;—where flying folds of steaming cloth thread a maze of wheels and pulleys, and rise and fall into troughs through which rivers of water ceaselessly rush;—places where giant cauldrons boil and bubble, fret and vomit up clouds of steam;—where the very air is so thick and solid that the lines of light are lost almost as soon as caught by the astonished eye, and into which a length of cloth that would girdle London round, with a good piece of the suburbs added to it, this day enters yellow or brown, and to-morrow emerges whiter than the snow of Carmel."

The processes through which every yard of cloth has to pass, before it is fit for sale, are most numerous and curious. Miles in length of it are subjected to some forty or fifty manipulations—to soakings and dryings, to heatings and foldings, which are too complicated for brief description, but which have not only to be done, and done well, but done so economically as to enable the producer to make his profit on it at so many halfpence per yard.

Pass from these establishments to those where other operations are going on. Witness the elaborate processes by which our streets are illumined at night, to the amount—in London alone—of three thousand millions of cubic feet of gas; but on which, having more to say hereafter, we shall not now dwell. Examine the methods by which the crude masses of ores are made to surrender their precious metals for the service of man. Scrutinise the ways in which the elements of nature are brought into antagonism with one another, and are thus mutually guided by the plastic hand of man into submissive obedience. Everywhere it will be found that there are processes going on in a high degree worthy examination, in which the arts are everywhere aided by the discoveries and appliances of chemistry.

THE LEGEND OF ST. KEVIN.

By that lake, whose gloomy shore
Skylark never warbles o'er,
Where the cliff hangs high and steep
Young Saint Kevin stole to sleep;
"Here, at least," he calmly said,
"Woman ne'er shall find my bed."
Ah! that good Saint little knew
What that wily sex can do.

'Twas from Kathleen's eyes he flew,—
Eyes of most unholy blue!
She had lov'd him well and long,
Wish'd him hers, nor thought it wrong.
Whereso'er the Saint would fly,
Still he heard her light foot nigh;
East or west, where'er he turn'd,
Still her eyes before him burn'd.

On the bold cliff's bosom cast,
Tranquil now he sleeps at last;
Dreams of heav'n, nor thinks that e'er
Woman's smile can haunt him there.
But nor earth nor heaven is free,
From her power, if fond she be;
Even now while calm he sleeps,
Kathleen o'er him leans and weeps.

Fearless she had track'd his feet
To this rocky, wild retreat;
And when morning met his view,
Her mild glances met him too.
Ah, your Saints have cruel hearts!
Sternly from his bed he starts,
And, with rude repulsive shock,
Hurls her from the beetling rock.

Glendalough, thy gloomy wave,
Soon was gentle Kathleen's grave!
Soon the Saint (yet ah! too late)
Felt her love, and mourn'd her fate.
When he said, "Heaven rest her soul!"
Round the lake light music stole,
And her ghost was seen to glide
Smiling o'er the fatal tide.

MOORE.